Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method of generating an MRI image of a medical device and proximate body tissue in which the device is located, wherein the medical device has incorporated therein an imaging material comprising selected MRI detectable nuclei, wherein the medical device further comprises a receiver coil, the method comprising:

performing a first MRI process on a body portion including at least a portion of the medical device to obtain first image data, wherein the first MRI process is adapted to detect MRI detectable nuclei present in the proximate body tissue by using an RF antenna external to the body portion;

performing a second MRI process on the body portion to obtain second image data, wherein the second MRI process is adapted to detect the selected MRI detectable nuclei contained in the medical device imaging material and the selected MRI detectable nuclei is not the same nuclei that the first MRI process is adapted to detect, wherein the receiver coil provides MRI enhancement by detecting a signal emitted from the MRI detectable nuclei contained in the medical device; and

combining the second image data with the first image data to produce combined image data for the medical device and the proximate body tissue, and that indicates the relative position of the medical device within the proximate body tissue.

2. (Original) The method of claim 1 wherein the first MRI process is a hydrogen nuclei MRI process.

3. (Original) The method of claim 1 wherein the first MRI process is a phosphor nuclei MRI process.

4. (Original) The method of claim 1 wherein the first MRI process is a potassium nuclei MRI process.

5. (Original) The method of claim 1 wherein the first MRI process is a sodium nuclei MRI process.

6. (Original) The method of claim 2 wherein the second MRI process is a fluorine nuclei MRI process and the imaging material incorporated into the medical device includes fluorine nuclei.

7. (Original) The method of claim 1 wherein the second MRI process is a fluorine nuclei MRI process and the imaging material incorporated into the medical device includes fluorine nuclei.

8. (Original) The method of claim 2 wherein the second MRI process is a phosphate nuclei MRI process and the imaging material incorporated into the medical device includes phosphate nuclei.

9. (Original) The method of claim 1 wherein the second MRI process is a phosphate nuclei MRI process and the imaging material incorporated into the medical device includes phosphate nuclei.

10. (Original) The method of claim 2 wherein the second MRI process is an iodine nuclei MRI process and the imaging material incorporated into the medical device includes iodine nuclei.

11. (Original) The method of claim 10 wherein the iodine nuclei are in the form of an iodine-polymer complex.

12. (Original) The method of claim 1 wherein the second MRI process is an iodine nuclei MRI process and the imaging material incorporated into the medical device includes iodine nuclei.

13. (Original) The method of claim 12 wherein the iodine nuclei are in the form of an iodine-polymer complex.

14. (Original) The method of claim 1 wherein the first MRI process uses a first frequency of transmitted radio frequency excitation pulses that is different from a second frequency of transmitted radio frequency excitation pulses used in the second MRI process.

15. (Original) The method of claim 1 wherein the first MRI process and the second MRI process use the same frequency for transmitted radio frequency excitation pulses, and wherein the first MRI process uses a first magnetic field strength that is different from a second magnetic field strength used in the second MRI process.

16. (Original) The method of claim 1 wherein the first and second MRI processes are performed during a common time period using a time-sharing technique that interleaves transmitted MRI excitation pulses used in each of the first and second MRI processes.

17. (Original) The method of claim 1 wherein the first and second MRI processes are performed at different times.

18. (Original) The method of claim 1 wherein multiple, successive samples of the combined image data are generated during the course of an intervention procedure.

19. (Original) The method of claim 18 wherein the method further comprising generating on a display device multiple, successive images of the multiple, successive samples of the combined image data as the combined image data samples are being generated.

20. (Original) The method of claim 1 wherein the method further comprises generating on a display device an image of the combined image data.

21. (Original) The method of claim 1, wherein the medical device is selected from the group consisting of catheters, grafts, implants, needles, and guide wires.

22. (Original) The method of claim 1, wherein the medical device is a catheter selected from the group consisting of guide catheters, balloon catheters, tumor ablation catheters, aneurysm catheters, urology catheters, and perfusion catheters.

23. (Original) The method of claim 1, wherein the medical device is a graft selected from the group consisting of vascular grafts and stent grafts.

24. (Original) The method of claim 1, wherein the medical device is an implant comprising a bulking agent.

25. (Original) The method of claim 1, wherein the imaging material is a liquid.

26. (Original) The method of claim 25, wherein the liquid is selected from the group consisting of a neat liquid, a solution, or an emulsion.

27. (Original) The method of claim 25, wherein the liquid is encapsulated.

28. (Original) The method of claim 27, wherein the liquid is encapsulated in a microsphere.

29. (Original) The method of claim 27, wherein the liquid is encapsulated in a lumen, a hollow fiber, a microporous material, a channel, or a cavity.

30. (Original) The method of claim 27, wherein the liquid is encapsulated in a microporous material.

31. (Original) The method of claim 30, wherein the microporous material comprises a microporous polymer.

32. (Original) The method of claim 31, wherein the microporous polymer comprises a polymer selected from the group consisting of polytetrafluoroethylene, polypropylene, polyethylene, polyurethane, EPDM rubbers, SIBS, polyamides, and combinations thereof.

33. (Original) The method of claim 30 wherein the microporous material comprises a film or a foam.

34. (Original) The method of claim 1, wherein the medical device comprises a structural material that includes the imaging material.

35. (Original) The method of claim 1, wherein the device comprises a coating that includes the imaging material.

36. (Original) The method of claim 35, wherein the coating comprises a hydrogel.

37. (Original) The method of claim 36, wherein the coating comprises a polymer selected from the group consisting of polyethylene oxide, polypropylene oxide, polyvinyl-pyrrolidone, polyurethane-polyurea, polycarboxylic acid, cellulosic polymers, gelatin, maleic anhydride polymers, polyamides, polysaccharides, polyvinyl alcohol, polyacrylic acid, and combinations thereof.

38. (Original) The method of claim 1, wherein the imaging material comprises a spin 1/2 nucleus.

39. (Original) The method of claim 1, wherein the imaging material comprises at least two spin 1/2 nuclei that are magnetically equivalent.

40. (Original) The method of claim 1, wherein the imaging material comprises an element selected from the group consisting of fluorine, phosphorus, hydrogen, sodium, and tritium.

41. (Original) The method of claim 7, wherein the agent comprises a perfluorinated compound selected from the group consisting of perfluoroalkanes, perfluoroalkylamines, perfluoro-crown-ethers, perfluorinated alcohols, perfluorohaloalkanes, perfluorinated carboxylic acids, perfluorinated acrylates, and perfluorinated esters.

42. (Original) The method of claim 7, wherein the imaging material comprises a perfluoroalkane selected from the group consisting of perfluorodecalin, perfluorononane, and combinations thereof.

43. (Original) The method of claim 7, wherein the imaging material comprises perfluoro-[15]-crown-5-ether.

44. (Original) The method of claim 7, wherein the imaging material comprises 4-fluoro-dl-glutamic acid.

45. (Original) The method of claim 7, wherein the imaging material comprises fluorinate alginate.

46. (Original) The method of claim 1, wherein the imaging material comprises a hydrogen-containing compound selected from the group consisting of acetic acid.

47. (Original) The method of claim 1, wherein the device further comprises a relaxation agent that decreases the spin-lattice relaxation time of the selected MRI detectable nuclei contained in the medical device imaging material.

48. -53. (Canceled)

54. (Previously Presented) A method of generating an MRI image of a medical device and proximate body tissue in which the device is located, wherein the medical device has incorporated therein an imaging material comprising selected MRI detectable nuclei, the method comprising:

performing a first MRI process on a body portion including at least a portion of the medical device to obtain first image data, wherein the first MRI process is adapted to detect MRI detectable nuclei present in the proximate body tissue;

performing a second MRI process on a body portion to obtain second image data, wherein the second MRI process is adapted to detect the selected MRI detectable nuclei contained in the medical device imaging material and the selected MRI detectable nuclei is not the same nuclei that the first MRI process is adapted to detect, wherein the first MRI process and the second MRI process use the same frequency for transmitted radio frequency excitation pulses, and wherein the first MRI process uses a first magnetic field strength that is different from a second magnetic field strength used in the second MRI process; and

combining the second image data with the first image data to produce combined image data for the medical device and the proximate body tissue, and that indicates the relative position of the medical device within the proximate body tissue.

55. (Previously Presented) A method of generating an MRI image of a medical device and proximate body tissue in which the device is located, wherein the medical device has incorporated therein an imaging material comprising selected MRI detectable nuclei, the method comprising:

performing a first MRI process on a body portion including at least a portion of the medical device to obtain first image data, wherein the first MRI process is adapted to detect

MRI detectable nuclei present in the proximate body tissue;

performing a second MRI process on a body portion to obtain second image data, wherein the second MRI process is adapted to detect the selected MRI detectable nuclei contained in the medical device imaging material and the selected MRI detectable nuclei is not the same nuclei that the first MRI process is adapted to detect, wherein the second MRI process is a fluorine nuclei MRI process and the imaging material incorporated into the medical device includes fluorine nuclei, wherein the imaging material comprises perfluoro-[15]-crown-5-ether; and

combining the second image data with the first image data to produce combined image data for the medical device and the proximate body tissue, and that indicates the relative position of the medical device within the proximate body tissue.